Post-it 1,3,65

PES Environmental, Inc.
Engineering & Environmental Services

A Report Prepared for:

Univar USA Inc.
3950 NW Yeon Avenue
Portland, Oregon

FINAL
VIDEO SURVEY AND LINE CLEANING WORK PLAN
UNIVAR USA INC.
PORTLAND, OREGON

JUNE 2, 2010

By:

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816.001.01.128

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1.0 INTRODUCTION AND OBJECTIVES

This Video Survey and Line Cleaning Work Plan has been prepared on behalf of Univar USA Inc. (Univar) as part of the Final Stormwater Pathway Investigation (SPI) Work Plan (PES, 2010a) at the Univar property at 3950 NW Yeon Avenue in Portland, Oregon (Figure 1). This final work plan has been prepared to address comments on the draft work plan (PES, 2010b) included in the U.S. Environmental Protection Agency's (EPA's) May 17, 2010 *Approval with Conditions of the Draft Video Survey and Line Cleaning Work Plan* (EPA, 2010) . This work plan is being submitted consistent with the Corrective Measures Implementation (CMI) Work Plan (PES 2008) prepared pursuant to the Amendment to the Administrative Order on Consent to Implement Corrective Action 1087-10-18-3008 (AOC Amendment) dated August 1, 2007, between the U.S. Environmental Protection Agency, Region 10 (EPA) and Univar (EPA 2007).

The activities described in this work plan are designed to accomplish three goals:

- Prepare a video record of the existing condition of an approximately 1,864-foot section of the 42-inch and 48-inch diameter storm sewer main located along the east and north property boundary of the Univar facility (Figure 2). City of Portland Bureau of Environmental Services (BES) manholes AAX261, AAT564, and AAT557 may require access dependent on conditions encountered. Additionally, Oregon Department of Transportation (ODOT) owned and maintained storm sewer main north of Univar between AMZ099 and AMZ098 will be video inspected as discussed below. This video record will document the baseline condition of the main and include the location of identifiable areas of damage, pulled joints, side connections, sagging or uplifted sections of pipe, and sediment/debris accumulation.

- Jet and clean the 1,400-foot section of the main at the Univar facility between BES manholes AAX261 and AAT557. The section of the main to be cleaned is shown on Figure 2. This section of main was cleaned and videotaped by Univar in 1996 and the downstream end partially cleaned in 2000 by the BES. The report (Harding Lawson Associates, 1996) documenting the 1996 cleaning is attached as Appendix A-1. BES documents concerning the 2000 cleaning efforts are included in Appendix A-2.

- Prepare a video record of the cleaned section of the main. The post-cleaning video survey will document the results of the cleaning and evaluate sections of the storm sewer main that may not have been accessible during the initial survey.

- Provide information to support the evaluation of the groundwater to stormwater pathway. Specifically, the 42-inch storm sewer main and the portion of the 48-inch ODOT storm sewer main north of Univar between AMZ099 and AMZ098 will be video inspected during periods of high shallow groundwater elevations (i.e., typically April or May) to document potential evidence of actual groundwater infiltration.

As applicable, all site work will be conducted consistent with the field and laboratory quality control guidelines of the SPI Work Plan (PES, 2010a).

2.0 WORK PLAN

The following tasks will be executed to meet the project goals stated in Section 1.0.

2.1 Task 1 – Pre-Survey Activities

The upstream access manhole on the 1,400-foot section of main to be cleaned, AAX261, is located on the Wilhelm Trucking property to the south of the Univar site (Figure 2). Univar will obtain permission from Wilhelm Trucking to access the main via the manhole on their property for the purpose of conducting the video survey (if necessary) and for the subsequent cleaning of the main.

As the 42-inch main is under the jurisdiction of BES, an access agreement from BES is required to conduct work and collect data from the main, including access to the upstream manhole. The downstream manholes for the project, AMZ099 and AMZ098, are within the ODOT Right-Of-Way (ROW) for NW Yeon Ave. A permit from ODOT to occupy or perform operations within the ROW is required by ODOT. PES shall be responsible for obtaining all permits from the BES and ODOT needed to execute the project. The selected contractor will be required to prepare a Traffic Control Plan (TCP) if required by the ODOT permit.

PES understands that the BES is planning to clean a section of the storm sewer main upstream from the Univar facility during 2010. PES will coordinate with the BES regarding these upstream activities to ensure that these activities do not impact each other and/or affect the data being collected.

PES will prepare a site-specific Health and Safety Plan (HASP) for PES oversight of the cleaning and videotaping scope of work. In addition, the contractor(s) selected to perform the cleaning and video survey work will be required to prepare a HASP for their work scope that will include contingencies for possible confined space entry and exposure to, and protection from, potentially toxic atmospheres that may be present within the main.

2.2 Task 2 - Baseline Conditions Video Survey

Upon completion and approval of necessary permitting, PES will provide prior notice of the work schedule to Wilhelm Trucking, EPA, BES, and ODOT. PES and the selected project contractor will then mobilize to the site to perform the baseline video survey. The video survey of the sewer main will provide a continuous record providing horizontal control for the video images along the 1,864-foot length of the main between AAX261 and AMZ098 and a running record of the depth of the pipe invert for the main. The video survey will provide the following information:

- The location and size of known side connections to the main, both from the Univar property and neighboring properties;
- The location and size of additional side connections exist that have not been previously identified;

- The locations and descriptions of pulled or partially pulled joints and the presence of cracks, sags, collapses, or other identified damage to the main;
- Areas of main requiring cleaning; and
- Document areas of potential groundwater infiltration for further evaluation.

The results of the baseline survey will be compared to the 1996 video survey results to identify major changes in pipe condition. Depending on the amount of sediment or other potential obstructions, it may not be possible for the video survey equipment to access the entire length of the sewer main prior to cleaning. Reasonable attempts will be made to access the portions of the main from various locations, including accessing AAX261, AAT564, AAT557, AMZ099, and AMZ098 from both upstream and downstream directions if necessary to document the greatest lengths of main possible. Portions of the main that could not be accessed during the baseline survey will be noted.

2.3 Task 3 – Storm Sewer Cleaning

After the initial video survey of the storm sewer has been conducted, the line between AAX261 and AAT557will be jetted and cleaned. This work will be conducted consistent with the Oregon Department of Environmental Quality's Characterization and Managing Catch Basin and In-Line Sediments within Portland Harbor (DEQ, 2009; Appendix B). Traffic control will be established in accordance with the approved TCP prepared by the contractor.

Prior to cleaning activities, the downstream (north) end of the storm sewer main will be plugged using an inflatable plug. This will allow sediments, debris, and water used to clean the storm sewer to be trapped at the downstream end of the main and prevent an inadvertent discharge and flushing of materials downstream. Accumulated sediment, debris, and water will be removed utilizing a vacuum truck during the jetting process to prevent materials from backing up the line and potentially resettling. The sediments, debris, and water recovered during the cleaning/jetting activities will be stored onsite in above-ground storage containers pending characterization for disposal.

Samples of the sediment and water generated during cleaning activities shall be collected from the storage containers for characterization (see Task 5 for details). Upon receipt of characterization results, the waste will be disposed of offsite at an approved facility.

2.4 Task 4 – Post-Cleaning Video Survey

After cleaning and jetting the storm sewer, the second video survey of the storm sewer main will be conducted consistent with the procedure described in Task 2. During the post-cleaning video survey, special attention will be paid to sections of the main that were previously obscured by, or could not be accessed due to, the presence of sediment or debris.

Concurrent with the post-cleaning video survey, and assuming that this task is conducted near the time of high water table (e.g., May), a video survey of the ODOT storm sewer main in front

of (i.e., north of) the Univar property will be conducted between AAT557 and AMZ098 to evaluate the potential for groundwater infiltration.

2.5 Task 5 – Sediment and Wastewater Sample Analysis

The project may potentially generate a significant amount of sediment/debris and thousands of gallons of wastewater. These wastes will be contained on site, characterized for disposal, and disposed of in accordance with federal, state, and local waste regulations. No sediment or wastewater will be disposed of in the storm sewer.

At this time, PES expects that the sediment/debris waste and the wastewater will both require offsite disposal. However, if the wastewater analytical data indicates that it may be acceptable for discharge into the City of Portland sanitary sewer system as described in City Code Chapter 17.34 "Industrial Wastewater Discharges", Univar may request permission from BES to make a batch discharge of the wastewater to the sanitary sewer.

Characterization samples will be analyzed for potential SPI Contaminants of Interest (COIs) as identified in the SPI WP (PES, 2010: Section 8.3 & 8.4, Tables 10 & 11). One sample will be collected and analyzed from each matrix. Records of sample collection, handling, and shipping will be documented on CMI/SPI field forms.

Solid matrix (sediment/debris) samples will be characterized by analyzing for SPI COIs using the following methods:

- Polychlorinated Biphenyl (PCB) Congeners by EPA Method 8082;
- Organochlorine Pesticides by EPA Method 8081A;
- Total metals by EPA Method 6010/6020 and EPA Method 7471. The specific metals analyzed include the aluminum (Al), antimony (Sb), arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), selenium (Se), silver (Ag), zinc (Zn), iron (Fe), and molybdenum (Mo);
- Semi-volatile organic compounds (SVOCs) by EPA Method 8270C;
- Chlorinated Herbicides by EPA Method 8151A;
- Dioxins and Furans by EPA Method 1613b;
- Volatile organic compounds (VOCs) by EPA Method 8260b;
- Total Petroleum Hydrocarbons (TPH) – diesel and residual range organics by Ecology Method NWTPH-Dx;
- Total organic carbon (TOC) by Plumb 1981 Method;
- Percent solids and grain size by Puget Sound Estuary Program (PSEP) 1986 Method;

- Sulfides by EPA Method 9030b;
- Sulfate by EPA Method 300.0M/9056; and
- Ammonia as nitrogen by EPA Method 350.1M.

Sediment samples will be collected from the waste storage containers using hand collection techniques consistent with the City of Portland Standard Operating Procedures Guidance for Sampling Catch Basin Solids (CH2M Hill, 2003) and modified as necessary for collecting bulk sediment samples removed during the cleaning and jetting process. A copy of the guidance is included in Appendix C.

Aqueous matrix samples will be analyzed for SPI COIs by the following methods:

- Total suspended solids (TSS) by EPA Method 160.2;
- Total organic carbon (TOC) by EPA Method 415.1;
- Total metals by EPA Methods 200.8 and 1631M. The specific metals to be analyzed include the Al, Sb, As, Cd, Cr, Cu, Pb, Mn, Hg, Ni, Se, Ag, Zn, and Mo;
- Dissolved iron by EPA Method 200.7;
- VOCs by EPA Method 8260b;
- SVOCs by EPA Method 8270C with PAHs by EPA Method 8270C select ion monitoring (SIM);
- PCB Congeners by EPA Method 8082;
- Chlorinated Herbicides by EPA Method 8151A;
- Organochlorine Pesticides by EPA Method 8081A;
- Cyanide by EPA Methods 335.4 (total), 9014 (free), and 335.1 (amenable);
- Oil and grease (hexane extractable materials [HEM]) by EPA Method 1664;
- TPH – diesel and residual range organics by Northwest TPH Method NWTPH-Dx;
- Sulfides by EPA Method 9030b;
- Sulfate by EPA Method 300/9036; and
- Ammonia as nitrogen by EPA Method 350.1.

The aqueous sample will be collected as a grab sample using a bailer or peristaltic pump. Field measurements of water conductivity, pH, and temperature will be collected and recorded during sampling.

3.0 REPORTING

Implementation of the Work Plan will begin as soon as possible to accommodate the seasonally high water table, but no more than 45 days after approval of the Work Plan. A technical memorandum will be prepared within 60 days of completion of the scope of work described above. The technical memorandum will include:

- A brief summary of the field activities performed under Tasks 1 through 5;
- Copies of video recordings and other electronic records generated during the video survey; and
- Documentation of the storage, characterization, and disposal of the sediment and wastewater generated during the cleaning activities. This will include analytical data generated from sampling (including data validation reports and electronic copies of laboratory reports).

The technical memorandum will also include an evaluation of the condition of the 42-inch main, a comparison of the current video survey results with the 1996 survey, a discussion of the adequacy of the cleaning effort with respect to future sampling of stormwater and sediment within the 42-inch main, a discussion of possible areas of groundwater infiltration along the main, and recommendations for future cleaning/repair work associated with the 42-inch main.

4.0 REFERENCES

CH2M Hill. 2003. *Standard Operating Procedures, Guidance for Sampling Catch Basin Solids.* Prepared for the City of Portland. July.

Harding Lawson Associates (HLA). 1996. *Field Report for Storm Sewer Inspection, Van Waters & Rogers, Inc., Portland, Oregon.* September 17.

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PES Environmental, Inc. (PES). 2008. *Final Corrective Measures Implementation Work Plan, Univar USA Inc., Portland, Oregon.* Prepared for Univar USA Inc. February 8.

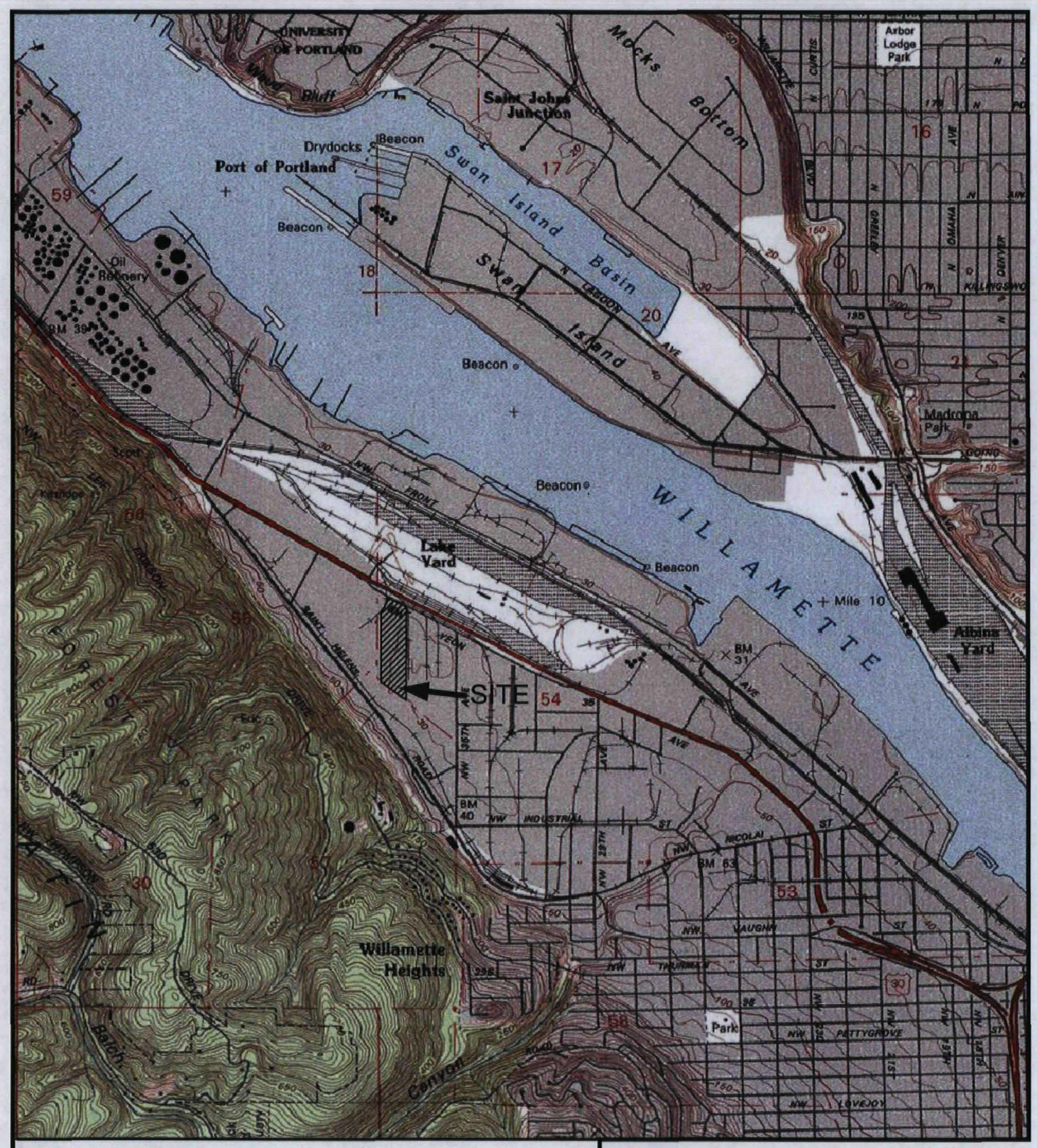
PES Environmental, Inc. (PES). 2010a. *Final Stormwater Pathway Investigation Work Plan, Univar USA Inc., Portland, Oregon.* Prepared for Univar USA Inc. March 29.

PES Environmental, Inc. (PES). 2010b. *Draft Video Survey and Line Cleaning Work Plan, Univar USA Inc., Portland, Oregon.* Prepared for Univar USA Inc. April 2.

U.S. Environmental Protection Agency (EPA). 2007. *Amendment to the Administrative Order on Consent RCRA Docket No. 1087-10-18-3008 for the Corrective Measures Implementation at the Univar USA Inc., Portland, Oregon Facility, EPA ID No. ORD009227398.* August 1.

U.S. Environmental Protection Agency (EPA). 2010. *Approval with Conditions of the Draft Video Survey and Line Cleaning Work Plan for Univar USA Inc., Portland, OR. Administrative Order on Consent RCRA Docket No. 1087-10-3008(h), EPA ID No. ORD009227398.* May 17.

FIGURES



SOURCE:
U.S.G.S. 7.5 Min. Quadrangle, PORTLAND, OR – WA 1961.

PES Environmental, Inc.
Engineering & Environmental Services

Video Survey and Line Cleaning Work Plan
Site Location Map
Univar USA Inc.
Portland, Oregon

FIGURE
1

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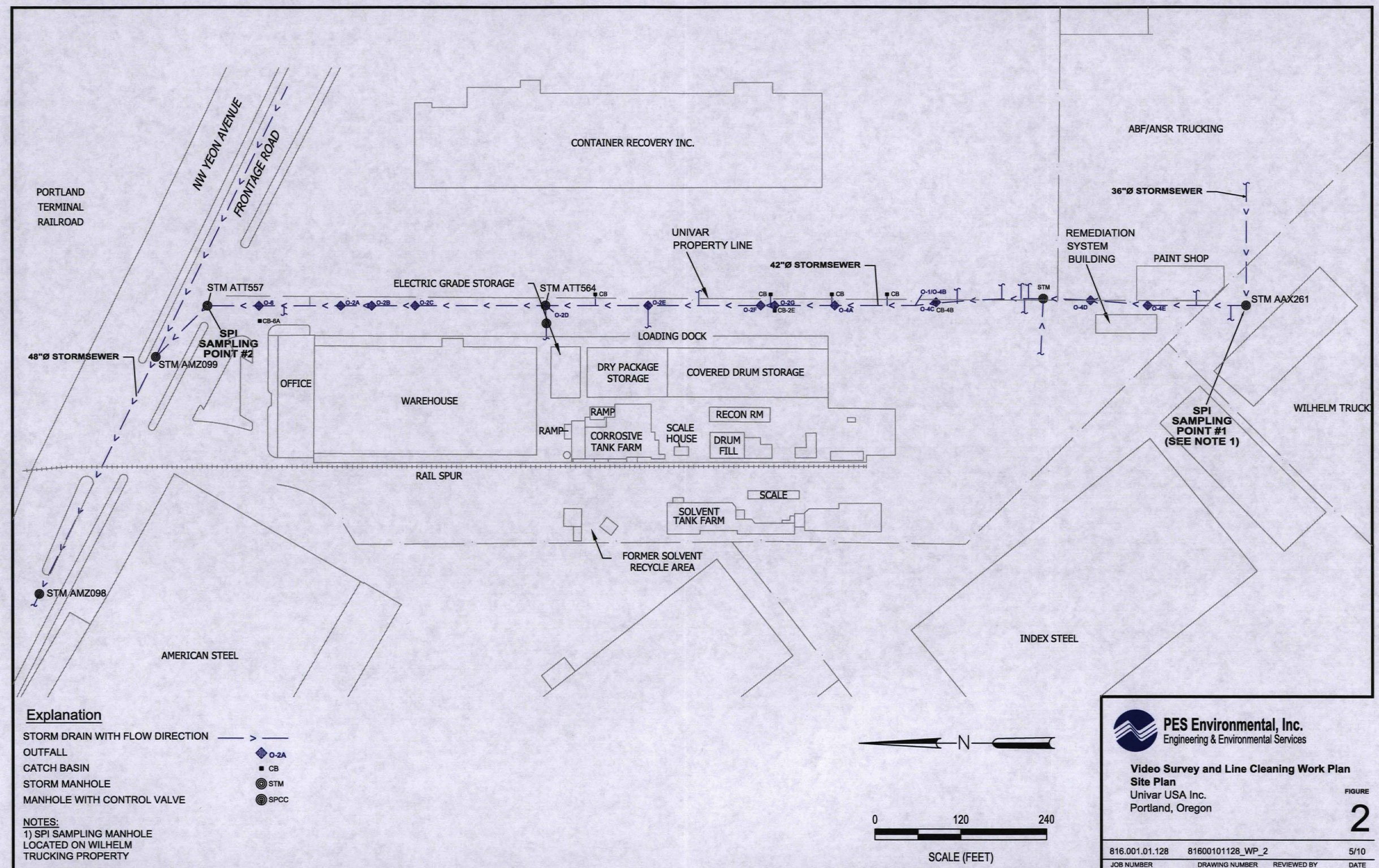
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

STORM DRAIN WITH FLOW DIRECTION	—— > ——
OUTFALL	O-2A
CATCH BASIN	CB
STORM MANHOLE	STM
MANHOLE WITH CONTROL VALVE	SPCC

NOTES:
1) SPI SAMPLING MANHOLE LOCATED ON WILHELM TRUCKING PROPERTY

N

0 120 240

SCALE (FEET)

PES Environmental, Inc.
Engineering & Environmental Services

Video Survey and Line Cleaning Work Plan
Site Plan
Univar USA Inc.
Portland, Oregon

FIGURE 2

816.001.01.128	81600101128_WP_2		5/10
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

APPENDIX A

APPENDIX A
PREVIOUS CLEANING DOCUMENTATION

APPENDIX A-1
1996 CLEANING REPORT

FIELD REPORT

for

Storm Sewer Inspection

Van Waters and Rogers, Inc.
Portland, Oregon

Prepared by:

Harding Lawson Associates, Infrastructure, Inc.

September 17, 1996

CC: Department of Environmental Quality
City of Portland

I. Introduction

Van Waters and Rogers, Inc. (VW&R) requested the services of Harding Lawson Associates (HLA) to assess the structural integrity of approximately 1400 feet of 42" storm drain. This work was done at the request of the Oregon Department of Environmental Quality on behalf of the City of Portland Environmental Services (The City). The City stated that the drain was approximately ~~35~~ 55 years old, and there are not any records of previous cleanings. The pipe runs along the east side of the VW&R facility in Portland, Oregon. Although water and sediment samples have been taken, this report will solely identify and evaluate the structural integrity of the line from information obtained by visual inspection via video survey. HLA obtained the services of Insituform Technologies, Inc. (formerly Gelco Services) to clean and video tape the 42" diameter storm water main. These services were performed on weekends only so that an adjacent user, Owen Corning, would not be discharging to the pipe during the cleaning or taping.

II. Procedures Used

Four separate taping sessions were required due to unforeseen circumstances. The first session was performed on June 25, 1996, but it was halted before the task was completed. A jet spray of water had been proposed for cleaning and flushing the line, as well as propelling the dragline of the video camera down the line. However, it was determined that the contaminant level of the outflow, due to TCE and PCE within sediments in line, would be too high to discharge to the Willamette River, so cleaning the line could not be allowed. The line did not have enough flow on its own to float the camera's dragline down the pipe. Another attempt was made using a camera mounted on a remotely operated vehicle. But the sediment in the line was too deep for the wheels on the camera to drive through, so the video taping had to be rescheduled.

The second attempt occurred on July 2, 1996. A video camera mounted on larger wheels was employed, but, again, the sediment in the pipe proved to be too thick to drive the camera down the line. It was decided that the line would require cleaning in order to continue.

The third attempt was made on August 2, 1996. The cleaning operation began by first installing a sandbag dam at the lower end of the 42" line to minimize the escape of suspended materials downstream. A dragline "bucket machine" was used to remove as much solid material as possible without the use of water. The remaining material was to be removed using a high velocity cleaner nozzle and a vacuum/cleaner truck. Following this procedure approximately one third of the line was cleaned and video taped. At this point, potentially hazardous and/or explosive vapors were detected and the cleaning/taping activities were stopped.

The fourth effort was made on the weekend of August 24, 1996. Because of the potential of hazardous/explosive vapors, the attached Health and Safety Plan was implemented (see Appendix B). The cleaning operation began by first installing an inflated plug at the lower end of the 42" line to prevent vapors and suspended material from moving downstream. A fan was placed on the catch basin at the upstream end of the pipe to draw out vapors generated during the cleaning and video taping operations. A dragline was then used to pull a high velocity cleaner nozzle and the video camera, trailing about 10 feet behind the nozzle, through the line. Using this method, the remainder of the line was successfully video taped.

III. Results

The cleaning effort on the 1400 feet of storm drain resulted in the removal 15 to 20 cubic yards of sediment, 10 to 15 thousand gallons of water was used. This volume of sediment removal is consistent with what would be expected from a storm sewer pipe of this age and size.

The results of the pipe inspection are shown on the site plan in Appendix A. Twenty-eight service lines, and number of broken, chipped, and pulled joints were identified. There is a relatively consistent amount of minor pot-holing along almost the entire length of the pipe. Nearly all the joints between Manhole 032 (MH 032) and Catch Basin 002 (CB 002) are pulled 1 to 2 inches of the 4 inch bell, 2 to 3 inches of the bell depth remains fitted together.

Perhaps the most notable problem found in the line was a sag in the storm line, that begins approximately 30 feet downstream of CB 002 and continues for about 350 feet towards MH 032. The lowest point appeared to be about 280 feet downstream of CB 002. About 12" of water and sediment remained in this section during the video taping.

Discoloration at some joints implied that groundwater had penetrated the pipe, mostly between Manholes 013 and 007 (MH 013 & MH 007). In addition, one joint between CB 002 and MH 032, 111 feet from CB 002, appeared to be leaking.

Some minor deterioration of pipe material was found 66 feet from MH 007, continuing from about 5 feet towards CB 002. Less than 10 feet downstream of this, what appeared to be a calcium buildup was forming on the top of the pipe, believed to be coming from pinholes in the pipe. Another 10-15 foot section was deteriorating at the top, approximately 90 feet downstream of MH 032.

There was a long stretch of pipe with a good deal of discoloration occurring along the sides. From about 200 feet from MH 013, downstream past MH 007 another 170 feet, the level of discoloration occurred from about 1/2 to 2/3 of the way up the sides of the pipe.

During the fourth cleaning effort burst of steam would periodically come through the storm pipe, at times the temperatures were noted to be near 100 degrees, after one of these burst of steam the low explosive level (lel) of the vapors in the pipe rose from 0 lel to 3 lel (10 lel is a hazardous level). Owen Corning had discharge from their site the night before.

IV. Conclusions

The 42" storm drain appears to be in good condition. No structurally suspect areas were observed, and only minor separations at joints and connections were noted. There are no signs of significant seepages indicating that the sediment buildup in this line originated from the VW&R site.

In a few spots, some minor deterioration of the interior surface of the pipe was noted. This however, is not beyond the normal deterioration that would be expected in a ~~35~~ 55 year old storm sewer pipe.

There is a sag in the line, about 350 feet long, that remained inundated with sediment laden water during the video taping. This portion of the pipe should be cleaned and flushed for a thorough inspection of the pipe in that area. This should be done by using the high velocity cleaner nozzle to suspend the sediments, then flushing the line with a high volume of water.

APPENDIX A

APPENDIX B

HEALTH and SAFETY PLAN

Prepared for:

STORM SEWER PROJECT

Van Waters & Rogers Inc.
3950 NW Yeon Avenue
Portland, Oregon

August 13, 1996

This plan has been prepared to inform all project personnel, including Van Waters & Rogers Inc. contractors and subcontractors, of the potential hazards at the facility. However, each contractor or subcontractor must assume responsibility for its own employees, health and safety

1.0 EMERGENCY INFORMATION SUMMARY

Site Name & Address:	Van Waters & Rogers Inc. 3950 NW Yeon Avenue Portland, Oregon (503) 222-1721
Telephone Numbers:	
Fire & Rescue	911
Ambulance	911
Hospital	(503) 229-7260
Police	911
Evacuation Maps	See Figure 1 for evacuation routes from the work area.
Route to nearest Hospital:	See Figure 2A for map to: Good Samaritan Hospital 1015 NW 22nd Avenue Portland, Or.

Site personnel must be able to respond effectively to any emergencies that might develop. The above location will be posted over the emergency phone located in the Environmental Affairs Office located adjacent to the southeast corner of the loading dock.

1.1 Evacuation Procedures

Upon hearing the emergency signal (i.e. long continuous blast from an air or vehicle horn, all personnel shall leave the work areas and gather at the designated assembly point(s). The evacuation routes are included in Figure 1. The Health & Safety Officer, or designee, will account for the workers at the assembly point and will then notify the VW&R Emergency Coordinator and necessary response

agencies. The Health & Safety Officer and Contractor Safety Officer will remain available (after evacuating) to assist the VW&R emergency coordinator and local responders and to provide information available/observed about the incident, if needed.

2.0 GENERAL INFORMATION

2.1 Purpose

This Health and Safety Plan provides guidance to personnel conducting work on the 42-inch storm sewer line and associated lateral lines at the Van Waters & Rogers Inc. (VW&R) facility in Portland, Oregon. This plan discusses potential chemical and physical hazards anticipated on site and details control measures to assure individual safety.

2.2 Distribution and Approval

The Project Manager will give a copy of this Health and Safety Plan to all site workers, including subcontractors. Subcontractors will follow these provisions as minimum recommendations; more stringent health and safety measures may be taken at their discretion. Subcontractors are responsible for the health and safety of their own employees. All personnel expected to work on the storm sewer project will read this Health and Safety Plan and will sign the consent form located in the back of this plan.

3.0 PROPOSED WORK ACTIVITIES and HAZARD EVALUATION

Work activities specifically addressed by this plan include cleanout of the sewer line, video taping the interior of the line, waste handling procedures, and sampling waste streams for chemical analyses.

3.1 Chemical Hazards

The work activities addressed by this plan may expose workers to chemicals that may cause direct bodily injury if exposures are at levels in excess of recommended exposure limits. There are three routes of exposure by which toxic chemicals can enter the body:

* Ingestion
* Absorption

* Inhalation

3.1.1 Ingestion

Workers may ingest materials unintentionally when they handle food, drink, smoke, etc., after contact with contaminated material, such as spent carbon, and before thoroughly washing their hands. This can be avoided if workers wash their hands prior to any of the above activities. At no time will food be allowed in any work area. Smoking is prohibited within the fenced compound of VW&R.

3.1.2 Absorption

Corrosive chemicals can damage the eyes and exterior layers of the skin. Some chemicals may cause chemical burns or severe dermatitis. Other chemicals are able to penetrate the skin, enter the bloodstream, and affect internal organs.

To avoid contact of chemicals with skin or eyes during spent carbon replacement, influent/effluent sampling and maintenance operations, workers will wear, at a minimum, long sleeve shirt and long pants, safety glasses/chemical goggles, gloves, and boots. The use of Tyvek suits is strongly recommended.

3.1.3 Inhalation

Foreign material may be inhaled and come in direct contact with lung tissue. This may cause an adverse affect on the lungs tissue which, if not irreversibly, may persist for a long time before the damage can be repaired to the body. The foreign material may also enter the bloodstream and affect all sensitive organs including the brain, heart, liver, kidneys, and reproductive organs.

Foreign material that may be inhaled during the project may include volatile organic compounds (VOCs) either as a vapor or adsorbed on to dust and/or fine dirt particles. Inhalation of dust and vapor phase chemicals can be successfully avoided by using respirators fitted with proper cartridges.

3.2 Physical Hazards

The physical hazards that may be encounter by personnel associated with the storm sewer project include:

* Mechanical Hazards

* Confined Space Hazards

* Electrical Hazards

* Heat Stress

3.2.1 Mechanical hazards

The VW&R facility is an active chemical distribution center in which a variety of mechanical hazards are present. Heavy equipment such as semi-trucks and forklifts are in constant use. The facility is serviced by the Burlington Northern Railroad and tank cars are switched in and out of the facility with no warning.

Mechanical hazardous directly associated with the project include:

* Muscle strains associated with the lifting/moving of heavy objects

* Heavy semi-truck traffic

* Falls from loose access ladders & cover plating associated with the temporary water holding tanks

* Bodily injury from heavy objects

At a minimum project workers and visitors will be required to wear eye protection at all times. Steel-toe boots and back support devises are strongly encouraged for all activities associated with the handling of heavy components. Traffic cones and/or other warring devices will be placed around all open manways and in areas where workers could be exposed to vehicular traffic.

3.2.4 Confined Space Hazards

The interior of the storm sewer and associated manways are considered to be a permit required confined space. An entry permit will be issued by the VW&R Operations Manager or his designated representative. A copy of this permit and VW&R's confined space program is provided in Appendix A. Only HAZWOPER certified workers with current certificates will be allowed entry into the sewer.

Specific hazards which could be encountered by worker include, but are not limited to:

* Oxygen deficient atmospheres
* Explosive or combustible atmospheres
* Hazardous chemicals (vapor, liquid, or solid phases)
* Rapid increase in water levels due to discharges from upgradient sources or storm events
* High temperatures from an inadvertent release of cooling tower waters

* Cave-ins
* Bodily injury from heavy object falling on workers

3.2.3 Electrical Hazards

All electrical equipment used in conjunction with the Project will be properly grounded and in good condition. Only qualified personnel will be allowed to work on electrical equipment.

3.2.4 Heat Stress

Heat stress may be encountered by workers during the coarse of the project.Heat stress may be caused by the combination of elevated ambient temperatures and the wearing of personnel protective equipment. The effects of heat stress are heat rash, cramps, exhaustion, and heat stroke. When participating in strenuous activities above 75^{0}F worker's heart rate will be monitored in accordance with the guidelines published in the U.S.Department of Health and Human Services (USDHHS), NIOSH/OSHAUSCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. Field personnel will be trained to recognize heat stress symptoms. Cool water or fluids will be readily available and employees will be encouraged to drink frequently during each break.

4.0 AIR MONITORING

4.1 Organic Vapor Monitoring

Continuous monitoring will be conducted for organic vapors using a calibrated photo ionization detector (OVM Model 550 or equivalent) by experienced personnel. Measurements of organic vapors will be used to delineate levels of personal protective equipment which project workers will be required to wear in the work area.

No air hazard	Level D
0-5 ppm above background	Level C
5-500 ppm above background	Level B

Project workers will withdraw from the work area if organic vapors are greater than 500 ppm and will not be permitted to resume work until VOC levels are below 500 ppm.

4.2 Combustible Gases/Vapors Monitoring

A combustible gas detector will be used to continuously monitor for explosive atmospheres during sewer cleanout operations. Explosivity readings greater than 10 percent of the lower explosive limit

(LEL) indicate that work may proceed with caution. If a combustible atmosphere (explosivity readings approaching or greater than 25 percent LEL) is detected, operations will be terminated and workers will immediately withdraw from the work area Operations will not resume until the potentially explosive atmosphere has been mitigated.

4.3 Oxygen-Deficient Atmospheres

Oxygen levels will be monitored prior to entry into any confined space and throughout cleanout operations. If less than 19.5% oxygen is present in the work area, project personnel will leave the area immediately. Work will not be resumed unless appropriate respiratory protective equipment (contained air) is obtained. The Site Safety Officer or designee will be on site to supervise activities during reentry. Oxygen-deficiency is most likely to occur in enclosed spaces such as manways and sewer interiors.

5.0 TOXICITY OF CONTAMINANTS OF CONCERN

The major contaminants of concern from the standpoint of health effects to project workers are: Tetrachloroethene, Trichlorethene, 1,1,1-Trichloroethane, Methylene Chloride, 1,1-Dichloroethene, Trichlorofluoromethane, 1,1-Dichloroethane, 1,2-Dichloroethene, Vinyl Chloride, Toluene, Xylene, Acetone, and 2- Butanone. Jetting/scraping operations, sewer entry, waste handling and sampling could expose workers to elevated levels of these chemicals.

Material Safety Data Sheets (MSDSs) for the above listed chemicals are available from the Branch Operations Manager or Warehouse/Tank Farm Supervisors.

6.0 PROTECTION LEVELS FOR SPECIFIC ACTIVITIES

6.1 Level D Activities

Storm Sewer Project activities where contact with contaminated material or water is *not probable*: Use safety glasses, hard-hat, work gloves, chemically-resistant safety boots.

Site activities where skin contact with contaminated material or water is *probable*: Use uncoated tyvek for dry dusts, or polyethylene-coated tyvek when splashes from potentially contaminated water and/or steam is likely. Wear neoprene or nitrile gloves during all activities with potential for skin contact with contaminated material or water and use faceshields or goggles as necessary during those same activities to avoid splashes into the eyes or face.

6.2 Level C Activities

In addition to the above equipment, use air-purifying respirators (half-mask) equipped with organic vapor cartridges when air concentration of organic vapors are between 0 and 5 ppm. If dust levels are objectionable, use dust filters on the respirator. In no case should these respirators be used if air concentrations exceed 5 ppm. Evaluation of further site activity should be halted pending notification of Project Manager and re-evaluation of work practices and protective gear.

6.3 Level B Activities

Level B protection will be selected when the highest level of respiratory protection is needed (VOC concentrations greater than 5 ppm and/or oxygen content less than 19.5%), but dermal exposure to the small unprotected areas of the body is unlikely. Typical Level B equipment would include:

* Positive pressure demand, air-supplied breathing apparatus
* Chemical resistant clothing
* Outer and inner gloves (both chemical resistant)
* Chemical resistant steel toe boots
* Hard hat

It is anticipated that work in confined spaces will require Level B personal protective equipment.

7.0 SAFETY EQUIPMENT

Safety equipment that must be available on site at readily accessible and identified locations include: a portable first aid kits, eyewash kits, and fire extinguishers. Contractor provided safety equipment such as harnesses, rescue tripods, explosimeters must be in good working condition and project workers must be familiar with operational procedures associated with each piece of equipment.

8.0 FIRE PREVENTION

Employees will not smoke on the site at any time. Welding, if required, will only be conducted in areas free of combustible materials and with the knowledge and approval of local VW&R management. on.

9.0 DECONTAMINATION

In order to assure that contaminated materials are not spread from the site, proper decontamination (decon) procedures will be employed for both equipment and personnel. Also, procedures for disposal of contaminated materials generated during the course of site operations and decontamination have been established.

9.1 Equipment Decontamination

Non-disposable equipment will be decontaminated upon leaving potentially contaminated work areas. Prior to demobilization, all contaminated portions of heavy equipment should be thoroughly cleaned. Soil and water sampling instruments should be cleaned in portable buckets.

9.2 Personnel Decontamination

Personnel with known or suspected contamination will perform a mini-decontamination to change respirator cartridges (if worn). They will decontaminate fully before eating lunch or leaving the site.

9.2.1 Mini-decon procedure (change cartridges)

a. Detergent wash and clean water rinse chemical-handling gloves
b. Inspection of protective outer suit, if worn, for severe contamination, rips or tears.
c. If suit is highly contaminated or damaged, full decontamination as outlined below will be performed.
d. Remove respirator and clean off sweat and dirt using pre-pre-moistened towelettes. Remove used cartridges and deposit in appropriate waste drum.
e. Replace fresh cartridges on respirator, recheck respirator for proper fit, and return to work.

9.2.2 Full decontamination procedure

a. Detergent wash, and clean water rinse, boots and outer gloves.
b. Remove protective suit and outer gloves and deposit in appropriate labeled waste drum.
c. Remove respirator (if worn). Remove respirator cartridges (if end of day) and discard in appropriate labelled waste drum.
d. Wash and rinse respirator in separate buckets.
e. Remove inner gloves and discard in plastic bag.
f. Wash hands and face in clean water; shower as soon after work shift as possible.

10.0 TRAINING AND DOCUMENTATION REQUIREMENTS

10.1 Basic Training Requirements

Employees who perform work on the site must understand potential hazards to health and safety associated with site sampling activities. All employees potentially exposed to hazardous substances, health hazards or safety hazards will therefore have undergone 40 hours of initial safety training off the site, and will have a minimum of three days of actual field experience under the direct supervision of a

trained supervisor. Annual refreshers of 8-hours are required. Supervisors must be trained at least to these levels, with additional training or experience required as necessary to properly supervise hazardous waste site work.

10.2 Documentation

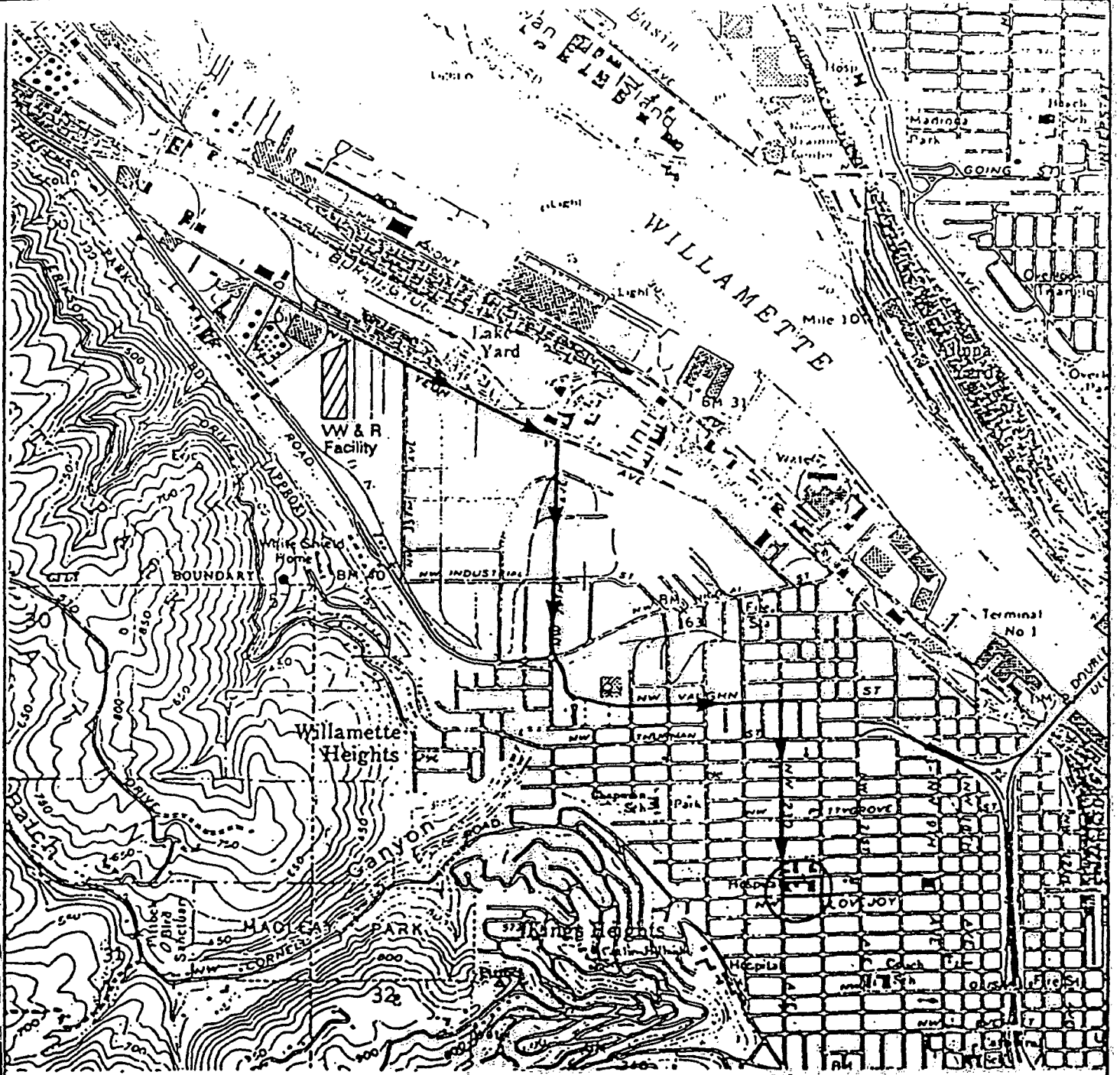
To assure H&SP implementation, staff on this site will sign, prior to commencing work, the Health and Safety Plan Consent Form, which will be kept on site during work activities. The Daily Safety Logbook will be reviewed daily by the Health and Safety Officer, to be sure all site workers have signed it. In addition, copies of each worker's Training Certificates, and medical clearance to use respirators (if worn) will be kept on site. A copy of this Health and Safety Plan will always be kept on site while activities are being performed.

HEALTH AND SAFETY PLAN CONSENT FORM
FOR

VWR, Portland Site

I have read the Health and Safety Plan pertaining to work to be performed at the above named site. I understand the contents of this Health and Safety Plan and agree to abide by its provisions. Any questions I had regarding the plan have been satisfactorily answered.

Name (print)	Signature	Date
Scott R Campbell	Scott R Campbell	08-25-96
Russ Gaston	Russell Gaston	Aug. 25, 96

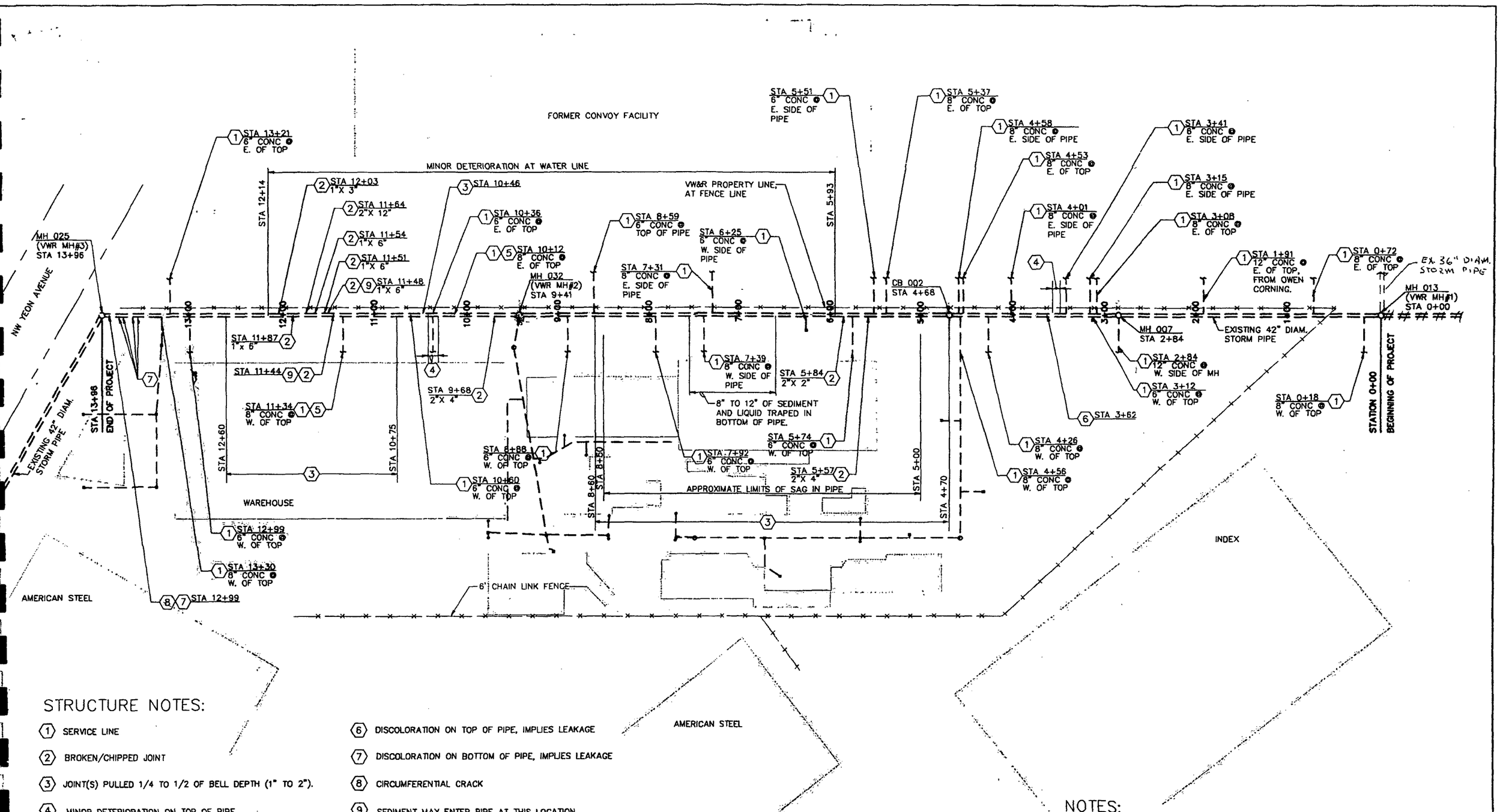


Harding Lawson Associates
Engineers and Geoscientists

Hospital Route Map
Facility Health and Safety Plan
Van Waters and Rogers, Inc.
Portland, Oregon

PLATE
A2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
AM	9695,040.02	CRS	2/89		



STRUCTURE NOTES:

1. SERVICE LINE
2. BROKEN/CHIPPED JOINT
3. JOINT(S) PULLED 1/4 TO 1/2 OF BELL DEPTH (1" TO 2").
4. MINOR DETERIORATION ON TOP OF PIPE
5. SERVICE LINE BROKEN AT END
6. DISCOLORATION ON TOP OF PIPE, IMPLIES LEAKAGE
7. DISCOLORATION ON BOTTOM OF PIPE, IMPLIES LEAKAGE
8. CIRCUMFERENTIAL CRACK
9. SEDIMENT MAY ENTER PIPE AT THIS LOCATION

PLAN

SCALE 50 0 50 100 FEET

NOTES:

1. ALL SERVICE LINE SIZES AND LOCATIONS ARE APPROXIMATE AND ARE NOT INTENDED FOR CONSTRUCTION PURPOSES. ONLY THE CONNECTIONS TO THE 42" STORM PIPE WAS OBTAINED FROM FIELD DATA.
2. ALL LOCATIONS OF STRUCTURAL OBSERVATIONS ARE BASED ON VIDEO TAPE SURVEY OF LINE.

VIEW: P
DATE: 09/17/96 6:55pm
DRG NAME: G:\MUNI\30849\VIDEO
JOB NO. 30849

DATE	BY	APPR	REVISIONS

R.GASTON, P.E. 9/17/96 DESIGNED BY DATE
R.GASTON, P.E. 9/17/96 DRAWN BY DATE
CHECKED BY DATE

INSPECTION OF 42" STORM DRAIN
VAN WATERS AND ROGERS, INC.
3950 N.W. YEON AVE., PORTLAND, OREGON

Harding Lawson Associates
Infrastructure, Inc.
AE Consultants

SHT 1 OF 1

Insituform Technologies, Inc.
West Region

TELEVISION INSPECTION REPORTS

Client: VAN WATERS & ROGERS Inspect Date: 08-02-96 Job No: 11869

Tape No: R1 Technician: RICHARSON Weather: RAIN Report ID: 680

Begin Manhole No: 1 End Manhole No: 2 Report No: R1

Pipe Diameter: 42" Pipe Type: CON Length of Section: 468'

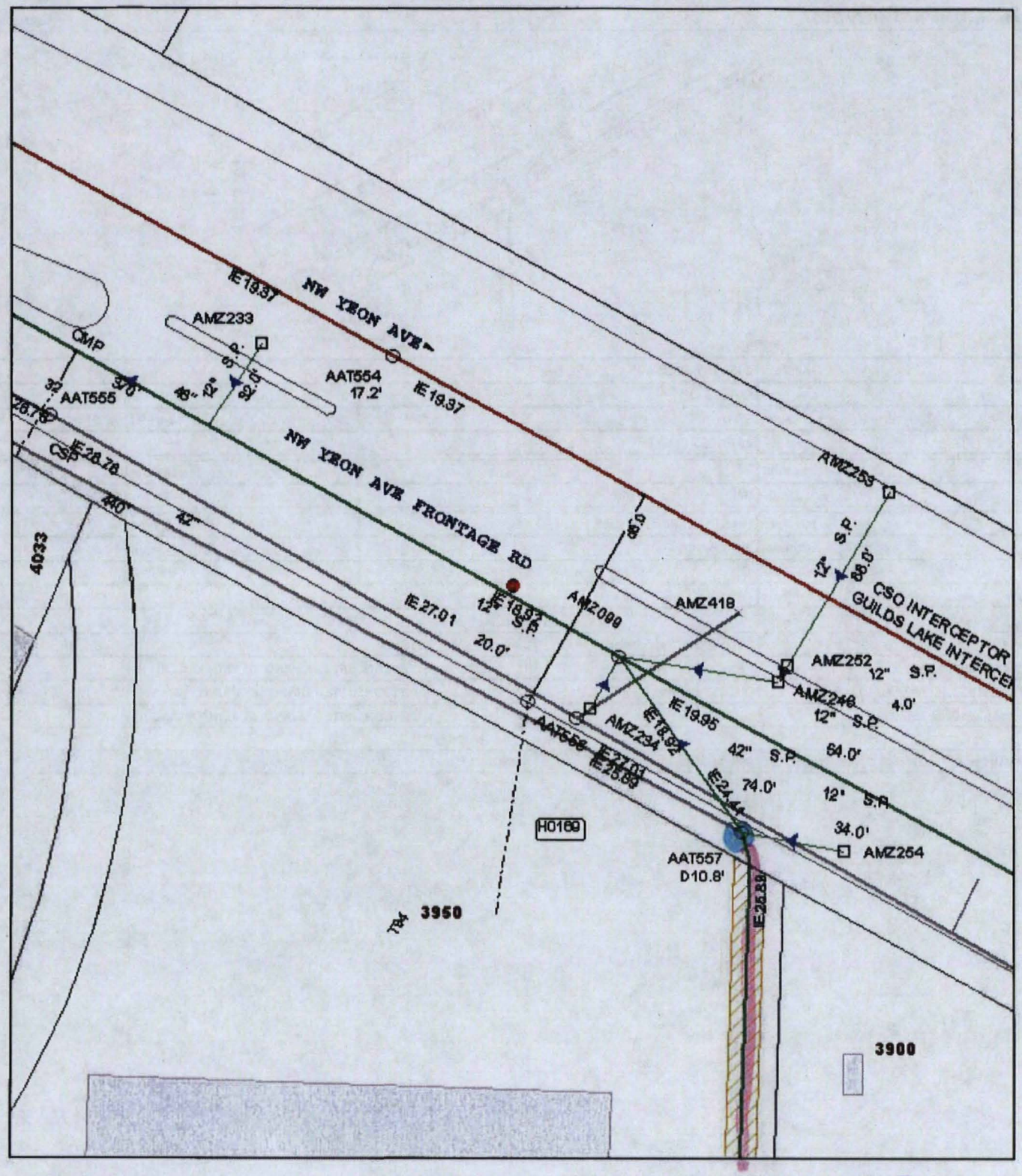
Joint Length: Page No: 2

PIPELINE VIDEO DATA

Location of Line:

Foot	Video	Problem	Comments	I/I Rate
0			AT MH# 1	
17		SERVICE LEFT		
72		SERVICE TOP RIGHT		
91		SERVICE TOP RIGHT		.2 gpm
252		SERVICE TOP RIGHT		
284		Service Left	MANHOLE 1A	
308		SERVICE TOP RIGHT		
312		SERVICE TOP RIGHT		
315		SERVICE RIGHT		.2 gpm
341		SERVICE RIGHT		.125 gpm
401		SERVICE RIGHT		
428		SERVICE LEFT		.2 gpm
453		SERVICE RIGHT		.2 gpm
456		SERVICE LEFT		
458		SERVICE RIGHT		
468			AT CATCH BASIN 2	

APPENDIX A-2
2000 CLEANING INFORMATION



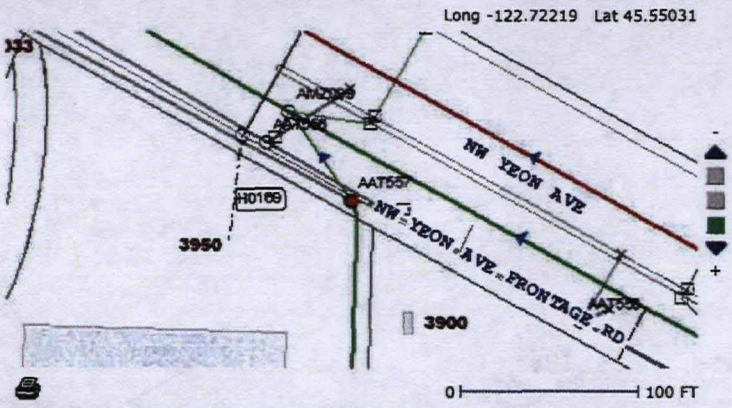
AAT 557 SDOT Line = BES

AAT 561 BES

DDOT

BES

Manhole Detail: STMH AAT557 Close Frame



Address	3950 NW YEON AVE		
Area	GUILDS LK	Subarea	2625
Location	STHT	District	WEST
Map #	2625-025D		

As Built		Install Date	
Service Status	IN	Owner	ODOT

MH Type	MH STANDARD MANHOLE	Lid Type	
Material	BRIK BRICK	Depth	10.8
Diversion #		Outfall #	
Comments			

In/Out Mains

Main ID	Flow	Service Status	Diameter	Material
STMN AAT564 TO AAT557	IN	IN	42	CSP CONCRETE - UNKNOWN REINFORCING
STMN AAT557 TO AAT491	OUT	ABAN	42	CSP CONCRETE - UNKNOWN REINFORCING
STMN AAT557 TO AMZ099	OUT	IN	42	CSP CONCRETE - UNKNOWN REINFORCING

Work Order History

Work Order #	Asset ID	Activity

Work Order Detail: 102082 Close Frame

Work Order #	102082	Asset ID	STMN AAT564 TO AAT557
		Activity	SPCLN - 15967115 SPECIAL SEWER CLEAN
		Address	3926 NW YEON AVE
Date Initiated	09/29/2000	Maint Type	UM - UNSCHEDULED MAINTENANCE
Initiated By	MBJPW	Priority	1 - ACTIVE PROBLEM
Project		Source	TVI
Authorization	MBJPW	Problem	DEBRI - DEBRIS
Assigned To	MBHKH		
Date Completed	10/03/2000	Condition	
Completed By	MBHKH	Result	
Hours	5	Quantity	
Comments	clean storm sewer for tv crew. they tved backwards and got in 237'. Down mh is in driveway area for company. go to front desk to let them know what you are doing on their property. JETTED 460FT TWICE.WAS UNABALE TO GET BY 270FT AFTER THAT.		

Associated Costs

Charge Date	Type	Item	Description	Quantity	Total Cost
10/03/2000	LABR	MBHKH	KENT HOPPER	5	149
10/03/2000	LABR	MBFCW	CHARLIE FARLESS	5	134.55
10/03/2000	VEH	W640	VACTOR	5	225.85

Work Order Detail: 102064

Close Frame

Work Order #	102064	Asset ID	STMN AAT564 TO AAT557
		Activity	SPSWTV - 15967315 SPECIAL SEWER TV
		Address	3926 NW YEON AVE
Date Initiated	09/28/2000	Maint Type	UM - UNSCHEDULED MAINTENANCE
Initiated By	ESCTE	Priority	B - URGENT MAINT - CRITICAL
Project		Source	ENGR
Authorization	MBCTC	Problem	
Assigned To	MBMWL		
Date Completed	09/29/2000	Condition	
Completed By	MBMWL	Result	
Hours	2.5	Quantity	460 FT
Comments	TV STORM LINE BACKWARDS FROM NODE 2625-025D TO 2625-032D ONLY. REQUESTED BY TOM CAUFIELD FOR ALI DIRKS. SOMEONE MAY HAVE HOOKED UP WRONG. REPORT ANYTHING WRONG TO SOURCE CONTROL AT 7180 NO TOP DIST. FLOW EAST COND. 237 FT. HEAVY DEBRIS BACK. INCOMPLETE.		

Associated Costs

Charge Date	Type	Item	Description	Quantity	Total Cost
09/29/2000	LABR	MBMWL	WILLIE MARTIN	2.5	78.25
09/29/2000	LABR	MBGTE	TERRY GALLANT	2.5	67.28
09/29/2000	VEH	220002	VAN, TV	2.5	12.5
09/29/2000	VEH	2302	TRK, PU 3/4T	2.5	7.5

Work Order Detail: 11316

Close Frame

Work Order #	11316	Asset ID	STMN AAT564 TO AAT557
		Activity	TVSTRM - DNU 15967310 INSPECT STORM TV
		Address	3926 NW YEON AVE
Date Initiated	02/06/1992	Maint Type	
Initiated By	ESBWD	Priority	4 - PROBLEM - NOT TIME CRITICAL
Project		Source	WPCL
Authorization		Problem	STINK - SEWER ODOR
Assigned To			
Date Completed	04/14/1995	Condition	
Completed By	MBJPW	Result	
Hours	0	Quantity	460 FT
Comments	FUMES in storm sewer. Pipe damage to lats. Possible sags in ms. May require pumping. Keep track of time for billing 14513021. NO TV. DANGEROUS CHEMICALS IN SEWER. TOLD SOURCE CONTROL TO HIRE CONTRACTOR IF THEY WANT THIS DONE. PJ.		

Associated Costs

Charge Date	Type	Item	Description	Quantity	Total Cost

Work Order Detail: 11247

Close Frame

Work Order #	11247	Asset ID	STMN AAT564 TO AAT557
		Activity	SEWCLN - 15967113 CLEAN SEWERS
		Address	3926 NW YEON AVE
Date Initiated	04/21/1992	Maint Type	
Initiated By	MBBML	Priority	2 - PROBLEM - TIME CRITICAL
Project		Source	WPCL
Authorization		Problem	STINK - SEWER ODOR
Assigned To			
Date Completed	12/20/1993	Condition	
Completed By	MBKJL	Result	
Hours	0	Quantity	460 FT
Comments	FUMES IN SEWER. CLEAN FOR TV. CONTACT PLANT MANAGER(KIRK STEINSEIFER) BEFORE ENTERING TO DO WORK-TRACK TIMEFOR BILLING CC14513021. BUD ISSUED PREVIOUS		

Associated Costs

Charge Date	Type	Item	Description	Quantity	Total Cost

TV Inspection Detail: 121118

Close Frame

Inspection #	121118	WO #	1-CAUFIELD	Activity	STMNTV
Asset ID	STMN AAT564 TO AAT557				
Address	3926 NW YEON AVE				
Started	09/29/2000	Project		Weather	OVC
Completed	09/29/2000	Operator	MBMWL	Flow Depth	1
				Reverse	Y

Media		Field Measurements		Condition Ratings	
Format	VHS	Top Distance		Structural	0
Media #	01	Joint Length		Root	0
Index	00	TV Distance		I/I	0
To	12:38			Overall	0
Comments					
Summary	NO TD. FLOW E. HEAVY DEBRIS. BACKOUT.				
Recommendations					

Readings

Setup	From	To	Index	Clock	Type	Code	Description
D	15	0		3	D	B	DEBRIS - MEDIUM
D	237	0		0	D	C	DEBRIS - HEAVY
BACKOUT.							
D	71	0		12	L	G	LATERAL - FACTORY SERVICE (TEE)
D	79	0		2	L	G	LATERAL - FACTORY SERVICE (TEE)
D	99	0		2	L	H	LATERAL - FACTORY WYE
D	0	0		0			
MH 2526-032D. CONCRETE. GOOD CONDITION.							
D	212	0		12			
CHIP OUT OF JT.							
D	112	0		2	R	A	ROOTS - LIGHT
POS. ?							

APPENDIX B
DEQ GUIDANCE DOCUMENT

Fact Sheet

Portland Harbor

Characterizing and Managing Catch Basin and In-line Sediments in Portland Harbor

State of Oregon
Department of Environmental Quality

Land Quality Division
Northwest Region
Cleanup and Lower Willamette Section
2020 SW 4th Avenue
Portland, OR 97201
Phone: (503) 229-5988
Fax: (503) 229-6899
Contact: Karen Tarnow
www.deq.state.or.us

Stormwater runoff from upland sites has been identified as one of the potential sources of contamination to the Willamette river. Evaluating and controlling discharges of contaminants via stormwater is an important consideration in source control at Portland Harbor sites.

The purpose of this fact sheet is to clarify DEQ's expectations regarding characterization and management of sediments removed from a stormwater catch basin or the stormwater conveyance system as part of a source control investigation at cleanup sites within the Portland Harbor (PH) study area.

Contaminants of Interest

When removing sediments from stormwater catch basins and conveyances, DEQ will generally require the property owner to analyze the sediments for all contaminants of interest (COIs) identified for the upland site and certain risk-driving chemicals of potential concern (COPCs) for Portland Harbor sediments.

For each clean-out activity, DEQ project managers will provide direction on the suite of chemicals for which laboratory analysis is required. General procedures for sampling stormwater and associated sediments are specified in the *Framework for Portland Harbor Storm Water Screening Evaluations* (*Appendix D* of the *Joint Source Control Strategy*).

DEQ project managers will consider the need to screen for COIs based on available site-specific information, available in-line sediment data from stormwater conveyances "downstream" of the site (if the site's stormwater discharges to another stormwater conveyance system before reaching the river) and analyses of in-river sediment adjacent to the outfall. In addition, DEQ is requiring all stormwater sediment samples to be analyzed for all of the phthalates and polychlorinated biphenyls (PCBs) listed in the *Joint Source Control Strategy*.

DEQ's *Framework for Portland Harbor Storm Water Screening Evaluations* provides guidance for developing site-specific work plans for evaluating stormwater runoff from upland sites. It is intended to ensure that information on stormwater discharges is collected in a consistent and thorough manner in support of the goals of the *Joint Source Control Strategy*. These documents are available at http://www.deq.state.or.us/lq/cu/nwr/PortlandHarbor/jointsource.htm

If contaminants are detected in stormwater solids at levels exceeding the contaminant screening levels listed in Table 3.1 of the *Joint Source Control Strategy*, further sampling may be required to identify the source and extent of contamination.

Source Control May be Required

If contaminants are detected in stormwater catch basin sediments at concentrations exceeding screening criteria, property owners will be expected to implement best management practices (BMPs) and conduct follow up stormwater monitoring (i.e., whole water sampling) to ensure that the source has been effectively controlled. It is likely that ongoing stormwater control measures will be necessary at most Portland Harbor upland sites to ensure that future stormwater discharges do not recontaminate the river or sediments.

Why is this Necessary?

Adequate characterization of stormwater discharges is an important step in the source control process. Properly identifying contaminants will help to ensure that effective controls are in place to prevent upland sources from contributing to ongoing contamination, and to future potential recontamination of Portland Harbor sediments.

Stormwater sediment data can provide critical information toward that end by determining if

Last Updated: 1/6/09
By: Karen Tarnow
DEQ 06-NWR-022

hazardous substance releases at an upland facility have impacted, or have the potential to impact Portland Harbor. This information will help ensure that source control measures are tailored to the specific source control needs of a site.

DEQ is requiring PCB and phthalate screening at all sites because these contaminants have been identified as preliminary risk drivers throughout the Portland Harbor area, and because of the varied and widespread use of these substances.

Additional Considerations

If source control efforts include the removal of sediments from stormwater conveyance lines, the line cleaning work plan should include analysis of both solids and wastewater generated by the cleaning process and a disposal plan for all wastes.

Sediments removed from the stormwater collection system may require dewatering and additional testing to ensure appropriate disposal in accordance with applicable DEQ Solid and Hazardous Waste regulations.

Wastewater generated from line cleaning activities may not be discharged to the private or municipal stormwater conveyance system. Wastewater disposal options include offsite disposal by a permitted private waste management company capable of appropriate treatment and disposal, or discharge to the City of Portland's sanitary sewer system through a batch discharge process (see below for details).

Notification Requirements

The City of Portland, Bureau of Environmental Services (BES) must be notified before you begin stormwater line cleanouts if any of the following three conditions apply to your facility:

- *Lines are connected to a municipal stormwater conveyance system.*

BES has requested notification of proposed cleaning operations in order to ensure worker safety for City and contract personnel and to verify that prohibited discharges of solids or wastewater are not made to the municipal conveyance system. A permit will be required if cleaning or sampling activities necessitate access to the City system. All stormwater line cleaning activities that connect to the City's conveyance system, and affiliated proposed access to City stormwater lines should be coordinated with the BES Portland Harbor Program, at (503) 823-2296.

- *Facility operations are covered by a General NPDES stormwater permit.*

For facilities with a General NPDES stormwater permit, notification will also allow for technical assistance and oversight from BES Permit Managers. BES administers stormwater General Permits for facilities within the City of Portland through a Memorandum of Understanding with DEQ. Contact the BES Industrial Stormwater Program at (503) 823-5320.

- *Line cleaning wastewater will be discharged to the sanitary sewer.*

Wastewater collected from these cleaning operations may not be discharged to the stormwater conveyance system even if the facility has an NPDES permit. It may be discharged to the City sanitary sewer system through a batch discharge process if it meets the wastewater discharge limitations established in City Code Chapter 17.34 "Industrial Wastewater Discharges" and is approved by the BES Industrial Source Control Division. Prohibited discharges include discharges of chemicals in toxic concentrations, of visible floating solids, and discharges that may cause a hazard to the City's system, personnel, or receiving waters. Coordinate batch discharge requests with the BES Industrial Projects Section at (503) 823-5320. Information and forms can also be found at the following link: http://www.portlandonline.com/index.cfm?c=37681#batch.

Facilities with Industrial Wastewater Discharge Permits administered by BES should consult directly with their BES Permit Managers.

Additional information on sampling and cleaning stormwater conveyance lines are included as attachments to *Appendix D* of the *Joint Source Control Strategy*.

For more information

If you have questions regarding Portland Harbor stormwater issues, please contact your DEQ Project Manager for more information, or contact Karen Tarnow, DEQ's Portland Harbor Stormwater Coordinator at 503-229-5988 or tarnow.karen.e@deq.state.or.us

Alternative formats

Alternative formats (Braille, large type) of this document can be made available. Contact DEQ's Office of Communications & Outreach, Portland, at (503) 229-5317, or toll-free in Oregon at 1-800-452-4011.

APPENDIX C
CATCH BASIN SAMPLING SOP

Standard Operating Procedures

Guidance for Sampling of Catch Basin Solids

Prepared for

City of Portland

March 2004

Prepared by

CH2MHILL

VERSION 1.0
USR/031550010.DOC

Contents

Standard Operating Procedures—Guidance for Sampling of Catch Basin Solids

1.0 Purpose

This document describes Standard Operating Procedures (SOPs), developed for the City, for the collection of environmental solids samples from stormwater catch basins. It provides procedures to be used for assessing potential pathways of contamination from upland sources via stormwater conveyances to receiving waters and sediments. Sampling for environmental investigations requires different methods than those that may be used for determining waste profiles for catch basin solids disposal.

The procedures described here are intended to provide representative samples of catch basin contents. These procedures may be modified for other purposes, such as assessing characteristics of older or newer solids, or because of space or access limitations. All deviations from these SOPs should be noted in field logs and reports.

1.1 Background

Catch basins are typically designed to prevent debris, gravels, and soils from fouling storm drain lines, and generally remove larger particles (greater than approximately 1 millimeter in diameter). Unlike specially designed stormwater treatment vaults, catch basins are not intended to remove fine particles or soluble pollutants, and they may only marginally reduce concentrations of contaminants or suspended solids. Catch basin retention efficiencies for suspended solids may be highly variable as functions of basin design, stormwater flow rates, accumulated solids in the sump (a function of cleaning frequency), and solids particle characteristics. Finer particle fractions may be suspended in moving water and carried beyond the catch basin. Because these finer particles are often correlated with organic and inorganic contaminants, special care needs to be taken while collecting catch basin solids samples to ensure that the finer particle fraction is sampled.

2.0 Scope and Applicability

The methodologies discussed in these SOPs are intended to provide procedures for collecting representative environmental samples of solids in stormwater catch basins. These SOPs describe specific steps that can be used to ensure representative and comparable data.

Residual material in catch basins is inherently variable. Factors that can affect variability include the characteristics of catch basin structures, the sources of particles, water flow rates and stormwater quality, and the depth and pattern of accumulated solids. In addition, the characteristics of catch basin solids can vary from slurry-like to dry solids. Although variability may be unavoidable, standard methods of collecting and handling samples can improve data quality.

3.0 Equipment and Materials

The following equipment should be available for collecting solids samples from catch basins:

- Sampler (generally one type will be selected per catch basin)
  - Stainless steel scoop, trowel, or spoon
  - Bucket (hand) auger
  - Hand corer
  - Petite Ponar® dredge/Van Veen® dredge (0.025 square meter [m^2])
- Sampling Equipment List
  - Site Sampling and Analysis Plan and/or site files detailing sampling locations, sample collection, and site information
  - Large stainless steel bowl
  - Stainless steel mixing spoon
  - Latex gloves
  - Metal or wooden rod
  - Field data sheets or other documentation
  - Laboratory-supplied sample containers
  - Cooler and ice/chilled blue ice
  - Tape measure
  - Ziploc® bags
  - Field notebook
  - Permanent marking pens
  - Sample labels
  - Chain-of-custody seals
  - Personal Protective Equipment (PPE)

4.0 Procedures

4.1 Documentation

Regardless of the equipment to be used, the following general procedures apply:

- Confirm any active catch basin best management practices such as sweeping and cleaning, frequency of activity, etc., if known.
- Document design flow rates (base flow, storm flow) for catch basins, if known.
- Record weather conditions at the time of sampling and last known rainfall event(s).
- Record the location of the catch basin. Include potential solids or contaminant sources such as construction activities, erosion, equipment storage or use, waste or material storage, vehicles, exhaust vents, onsite processes, etc. Site features, distances, flow directions, and gradients should be noted or sketched on a site map.

- Record dimensions of catch basin. Diagram inlet/outlet pipes in the catch basin. The source of inlet flows and destination of outlet flows should be noted, if known.
- Note the presence of water, visible flows, signs of flooding, clogging, debris in or around the catch basin, blocked inlets/outlets, staining, etc.
- Note any apparent evidence of contamination in the catch basin, such as odor, sheen, discoloration, etc., of water or solids.
- Measure the depth of solids in the catch basin and the total depth of the catch basin or sump. Use a decontaminated metal rod or disposable wooden dowel to probe the total depth of the catch basin.
- When recovering samples, record visual observations of:
  - Color
  - Texture, estimates of particle size fractions (as soil classification)
  - Amount and type of debris (Note: any large debris observed in the sample, including sticks, leaves, beverage containers, miscellaneous pieces of plastic and metal, stones and gravel, etc., should be removed, but paint chips and small organic matter should be left in the sample)
- Prepare a diagram of sampling locations within the catch basin, noting any special features such as sumps, inlets and outlets, etc.
- Decontaminate all sampling equipment using documented procedures before and after any sampling activities. Record the decontamination procedures in the field notes.
- Record any deviations from the specified sampling procedures or any obstacles encountered.
- Complete a chain-of-custody form for all samples.

4.2 Selection of Sampling Method

Sampling equipment should be matched with the presence and depth of water, solids water content, and catch basin depth. Figure 1 presents a flow chart for determining the appropriate sampling device. Detailed descriptions of each sampling method are presented in Section 4.3.

4.2.1 Decontamination of Equipment

Non-disposable equipment that contacts solids samples should be thoroughly cleaned and decontaminated before each set of samples is collected. Decontamination should be done in accordance with City of Portland SOP 7.01a[1] or comparable standard. Decontamination solutions should be selected on the basis of the type of analysis being conducted on samples.

[1] Bureau of Environmental Services, Environmental Investigations Division, SOP No. 7.01a Draft or subsequent revisions, Decontamination of Sampling Equipment.

4.3 Sample Collection

This guidance for sampling catch basins is intended to assess individual catch basins as potential sources of past, present, or future conduits of contamination to Willamette River sediments. Sample collection should therefore incorporate material representative of the total depth and area unless specific alternative sampling objectives are otherwise noted and approved. In some cases, sample collection from discrete depths may be desired based on knowledge of catch basin maintenance and time since last cleaning, activities conducted within the drainage area, spills or releases, and related information.

Standing water in the catch basin, if present, may be pumped off to simplify sample collection. If this procedure is conducted, care must be taken to:

- Pump water from the surface only
- Leave a thin layer of water so that fine materials in the solids are not disturbed
- Pump water slowly so that fine materials are not disturbed
- Dispose of pumped water in the sanitary sewer (pumped water may not be released into the storm system)
- Document all steps taken, the depth and volume of water removed, the point of water disposal, water remaining before sampling, and other relevant factors

4.3.1 Sampling Firm Solids in Catch Basins without Standing Water

Firm solids above the water line are most easily collected using simple soil sampling tools (that is, stainless steel spoon or trowel, or bucket auger). When sampling with a spoon or auger, solids may be moist or wet but should retain their form and structure when handled. (Note: If the sample has a high water content [water drips from solids], another sampling method should be considered to minimize the loss of fine particles in liquid drainage.)

4.3.1.1 Stainless Steel Spoon, Scoop, or Trowel

If necessary, the spoon, scoop, or trowel may be attached to an extension pole in order to reach the bottom of the catch basin, provided a representative sample can be retained on the spoon and recovered intact.

The following procedure defines steps to be taken when sampling dry or moist solids with a stainless steel spoon, scoop, or trowel:

1. Collect the necessary equipment. Clean and decontaminate the equipment, using procedures appropriate for the analytical parameters to be measured.
2. Arrange the appropriate sampling containers.
3. Don a new pair of nitrile or latex gloves.
4. Using a decontaminated stainless steel spoon, scoop, or trowel, collect an equal amount of material from five locations: each corner (or, if round, each compass point) and the center. Material recovered at each point should be a composite of the total depth of accumulated material, unless otherwise specified in the sampling plan.

5. Place sampled solids into a decontaminated stainless steel bowl or tray. Repeat step 4 as necessary in order to obtain the required volume, and mix to homogenize thoroughly using a decontaminated or disposable stainless steel spoon.
6. Collect a suitable portion of the mixed solids with a decontaminated or disposable stainless steel spoon and place into each appropriate sample container.
7. Check that a Teflon® liner is present in caps, if required. Secure the caps tightly. Label sample containers clearly with all appropriate sample information.
8. Place samples in cooler for transport. Refrigeration to 4° Celsius (C) is usually required. Transport time to the laboratory should be as short as possible and must be documented with a chain-of-custody form.
9. Ensure that appropriate field notes, as detailed in the Field Documentation, Section 4.1, have been collected.
10. Complete the chain-of-custody documents.

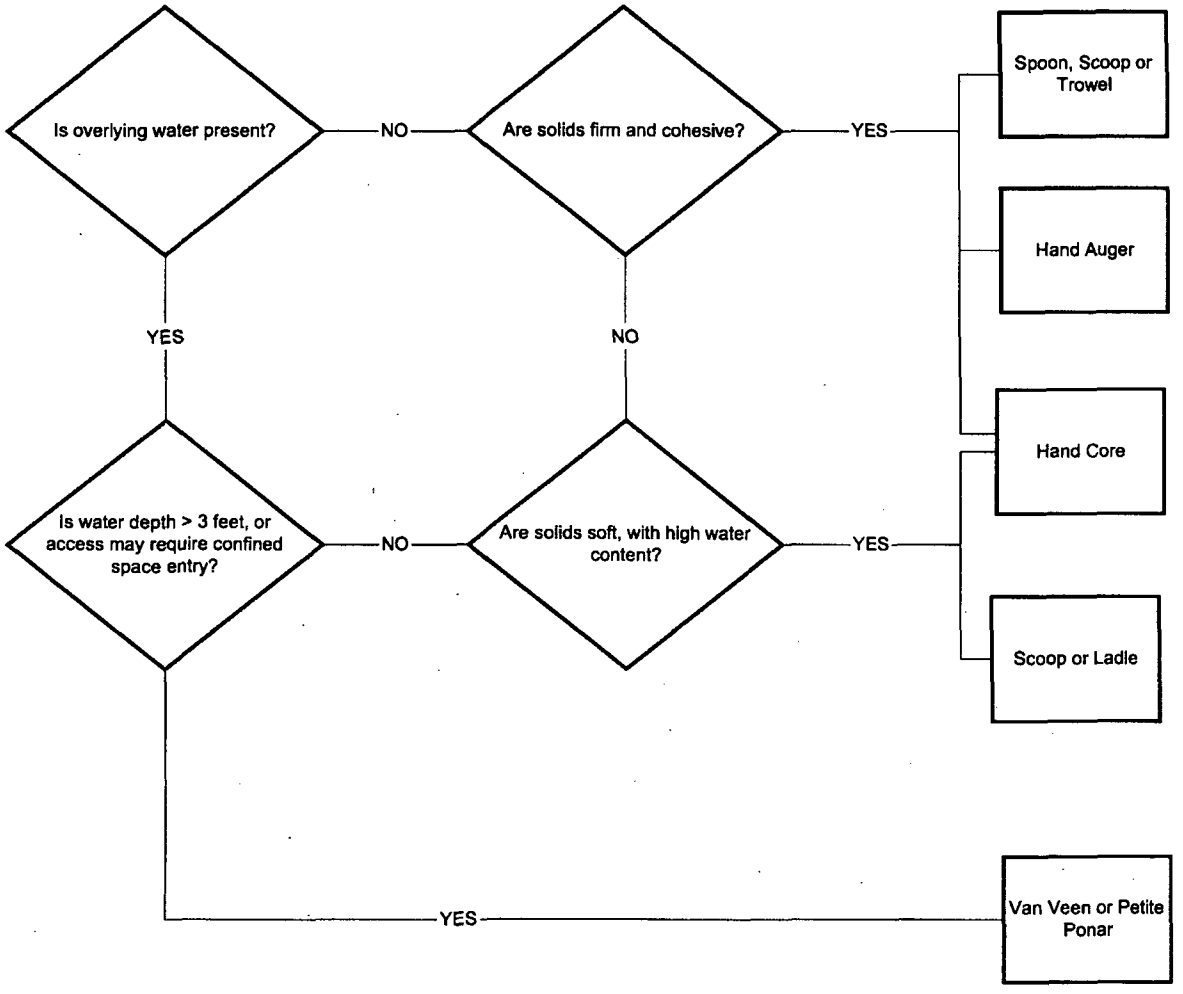
4.3.1.2 Stainless Steel Bucket Auger (Hand Auger)

Bucket augers are applicable to the same situations and materials as the spoon, scoop, and trowel method described above. Most bucket augers have long handles (> 4 feet), and some can be fitted with extension handles that will allow the collection of solids from deeper catch basins.

The following procedure defines steps to be taken when sampling dry or moist solids with a stainless steel bucket auger:

1. Collect the necessary equipment. Clean and decontaminate the equipment, using procedures appropriate for the analytical parameters to be measured.
2. Arrange the appropriate sampling containers.
3. Don a new pair of nitrile or latex gloves.
4. Advance a thoroughly cleaned and decontaminated bucket auger into catch basin solids in each corner (or, if round, each compass point) and the center of the catch basin. Material recovered at each point should be a composite of the total depth of accumulated material, unless otherwise specified in the sampling plan.
5. Empty the auger into a stainless steel bowl or tray. Repeat step 4 as necessary in order to obtain the required volume and mix to homogenize thoroughly, using a decontaminated or disposable stainless steel spoon.
6. Collect a suitable portion of the mixed solids with a decontaminated or disposable stainless steel spoon and place the sample into each appropriate sample container.

Figure 1. Flow Chart for Selecting the Appropriate Catch Basin Solids Sampler



7. Check that a Teflon® liner is present in caps, if required. Secure the caps tightly. Label sample containers clearly with all appropriate sample information.
8. Place samples in cooler for transport. Refrigeration to 4° Celsius (C) is usually required. Transport time to the laboratory should be as short as possible and must be documented with a chain-of-custody form.
9. Ensure that appropriate field notes, as detailed in the Field Documentation, Section 4.1, have been collected.
10. Complete the chain-of-custody documents.

4.3.2 Sampling Solids in Catch Basins with Standing Water

Hand corers or dredge samplers should be used when standing water is present in catch basins to prevent washout of sample material when the sampler is retrieved through the water column. Corers may also be used for dry and moist solids. Some hand corers can be fitted with extension handles that will allow the collection of samples in deeper basins.

4.3.2.1 Hand Corers

The following procedure defines steps to be taken when sampling saturated solids with a stainless steel hand corer:

1. Collect the necessary equipment. Clean and decontaminate the equipment, using procedures appropriate for the analytical parameters to be measured.
2. Arrange the appropriate sampling containers.
3. Don a new pair of nitrile or latex gloves.
4. Using a thoroughly cleaned and decontaminated corer, advance the sampler into catch basin solids with a smooth, continuous motion, twist corer, and then withdraw it in a single motion.
5. Remove the nosepiece and withdraw the sample into a stainless steel bowl or tray.
6. Repeat steps 4 and 5 in each corner (or, if round, each compass point) and the center of the catch basin. Material recovered at each point should be a composite of the total depth of accumulated material, unless otherwise specified in the sampling plan.
7. Mix to homogenize thoroughly, using a decontaminated or disposable stainless steel spoon.
8. Collect a suitable portion of the mixed solids with the decontaminated or disposable stainless steel spoon and place into each appropriate sample container.
9. Check that a Teflon® liner is present in caps, if required. Secure the caps tightly. Label sample containers clearly with all appropriate sample information.
10. Place samples in cooler for transport. Refrigeration to 4° Celsius (C) is usually required. Transport time to the laboratory should be as short as possible and must be documented with a chain-of-custody form.

11. Ensure that appropriate field notes, as detailed in Section 4.1, Documentation, have been collected.

12. Complete the chain-of-custody documents.

4.3.2.2 Clamshell-Type Dredge Samplers

Clamshell-type dredge samplers like the Petite Poner® and Van Veen® 0.025-m^2 dredge sampler are capable of sampling moist and wet solids, including those below standing water. However, penetration depths usually will not exceed several inches, so it may not be possible to collect a representative sample if the solids layer is greater than several inches. The sampling action of these devices causes agitation currents that may temporarily resuspend some settled solids. This disturbance can be minimized by lowering the sampler slowly and by allowing slow contact with the solids.

Samples collected with clamshell-type dredge samplers should meet the following acceptability criteria in order to ensure that representative samples have been collected (EPA, 2001):

- Solids do not extrude from the upper surface of the sampler.
- Overlying water is present in the sampler (indicating minimal leakage).
- Overlying water is clear and not excessively turbid.
- Desired depth of penetration has been achieved.
- The solids-water interface is intact and relatively flat, with no sign of channeling or sample washout.
- There is no evidence of sample loss.

The following procedure defines steps to be taken when sampling moist, wet, or submerged solids with a dredge sampler:

1. Collect the necessary equipment. Clean and decontaminate the equipment, using procedures appropriate for the analytical parameters to be measured.
2. Arrange the appropriate sampling containers.
3. Don a new pair of nitrile or latex gloves.
4. Using a thoroughly cleaned and decontaminated dredge-type sampler and working on a clean, decontaminated surface, arrange the sampler in the open position, setting the trip bar so that the sampler remains open when lifted from the top.
5. Slowly lower the sampler to a point just above the solids surface.
6. Drop the sampler sharply into the solids, then pull sharply on the line, thus releasing the trip bar and closing the dredge.
7. Raise the sampler and place on a clean surface. Slowly decant or siphon any free liquid through the top of the sampler. Take care to ensure that fines are not lost in the process; if necessary, allow the sampler to sit and the fine particles to settle before decanting or siphoning free liquid.

8. Open the dredge and transfer the solids into a large stainless steel bowl or tray of sufficient size to receive three sample loads.
9. Repeat steps 4 through 8 in diagonal corners (or, if round, two opposite compass points) and the center of the catch basin. Material recovered at each point should be representative of the total depth of solids in the sampling device. If necessary, modify sampling points to correspond to catch basin size or dimensions. Record any deviations in the field notes.
10. Mix to homogenize thoroughly, using a decontaminated or disposable stainless steel spoon.
11. Collect a suitable portion of the mixed solids with a decontaminated or disposable stainless steel spoon and place into each appropriate sample container.
12. Check that a Teflon® liner is present in caps, if required. Secure the caps tightly. Label sample containers clearly with all appropriate sample information.
13. Place samples in cooler for transport. Refrigeration to 4° Celsius (C) is usually required. Transport time to the laboratory should be as short as possible and must be documented with a chain-of-custody form.
14. Ensure that appropriate field notes, as detailed in the Field Documentation, Section 4.1, have been collected.
15. Complete the chain-of-custody documents.

5.0 Sample Acceptability

Only solids that are collected correctly with grab or core sampling devices should be used for subsequent physicochemical testing. Acceptability of grabs can be ascertained by noting that the samplers are closed when retrieved, are relatively full of solids (but not overfilled), and do not appear to have lost surficial fines. Core samples are acceptable if the core was inserted vertically in the solids and an adequate depth was sampled without significant loss out the mouth of the corer.

6.0 Quality Assurance and Quality Control

A rinsate sample may be appropriate or required when non-disposable sampling equipment is used. The equipment rinsate should be collected between sampling locations and after the device has been decontaminated. The rinsate sample should be analyzed for the same parameters analyzed for in solids.

7.0 Resources

1. ASTM. September 1994. Standard Guide for Collection, Storage, Characterization, and Manipulation of Sediment for Toxicological Testing. American Society for Testing and Materials (E 1391-94). West Conshohocken, Pennsylvania.

2. EPA. 1987. A Compendium of Superfund Field Operations Methods, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response (EPA/540/P-87/001), Washington, D.C.

3. EPA. 2001. Methods for Collection, Storage, and Manipulation of Sediment for Chemical and Toxicological Analyses: Technical Manual. U.S. Environmental Protection Agency, Office of Water (EPA-823-B-01-002). Washington, D.C. October 2001.

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